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Global Climate Change: A Serious Threat to Native American Lands and Culture

by Jacqueline P. Hand

Editors' Summary: During the past decade, public perception of global climate change has transformed from a gloom and doom scenario not to be taken seriously to a nearly universally recognized peril to the planet. Native Americans, especially those in the Arctic region, experience changes in climate with greater immediacy than the general population, and this disproportionate result is expected to become more severe as the effects of climate change escalate. This Article will explore the nature of the impact of climate change on Native Americans, the importance of including traditional tribal knowledge and expertise in understanding the crisis and developing adaptive mechanisms, and the responses by individual tribes as well as by indigenous people as a whole.

I. Climate Change Impacts on Native Peoples

The mechanics of climate change have been fully explained by a number of excellent sources.¹ Very briefly, global warming is caused by the release of greenhouse gases (GHGs) generated by large quantities of fossil fuels used by our post-Industrial Revolution economy. These gases regulate how much of the sun's heat is reflected back into space and how much is trapped by the earth's atmosphere. The United Nations (U.N.) Intergovernmental Panel on Climate Change (IPCC) estimates that the average surface temperature of the earth will increase between 2.5 and 10.4 degrees Fahrenheit (°F) within the next 100 years if GHGs are not sharply curtailed.²

The impacts of these temperature changes are and will continue to be dramatic. They are not limited to the direct effects of hotter weather, ranging from drought to violent storms, but also include consequences such as crop losses leading to food shortages,³ new diseases, and water short-

ages.⁴ In addition, greater temperatures lead to warmer oceans, which lead to melting icebergs, rising sea levels, and flooding.⁵ This rise in water temperature may lead to more intense storm events and will have a direct impact on coral and fish species.⁶ These changes can impact the geographic

Due to the very large number of people that may be affected, malnutrition linked to extreme climactic events may be one of the most important consequences of climate change Climate change is projected to increase the percentage of Malian population at risk of hunger from 34% to between 64% and 72% by the 2050's.

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1. For a particularly lucid explanation, see Union of Concerned Scientists, *Frequently Asked Questions About Global Warming*, http://www.ucsusa.org/global_warming/science/global-warming-faq.html (last visited Mar. 11, 2008) [hereinafter Union of Concerned Scientists FAQ]; see also STERN REVIEW, THE ECONOMICS OF CLIMATE CHANGE, SUMMARY OF CONCLUSIONS (2008), available at http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm.
2. See Union of Concerned Scientists FAQ, *supra* note 1 (summarizing the IPCC's Fourth Assessment Report).
3. See IPCC, WORKING GROUP II, IMPACTS, ADAPTATION AND VULNERABILITY 413-14 (2007), available at <http://www.ipcc-wg2.org/> [hereinafter IPCC WORKING GROUP II REPORT]:

4. See IPCC FOURTH ASSESSMENT REPORT, WORKING GROUP II REPORT, IMPACTS, ADAPTATION AND VULNERABILITY, SUMMARY FOR POLICYMAKERS 11 (2007), available at <http://www.ipcc-wg2.org/> (predicting that unmitigated, possible effects of global climate change could include a declining of water supplies stored in glaciers and snow covers, which would reduce "water availability in regions supplied by meltwater from major mountain ranges, where more than one-sixth of the world population live") [hereinafter IPCC IMPACTS SUMMARY FOR POLICYMAKERS]; see also *id.* at 13 ("By 2020 between 75 million and 250 million people (in Africa) are projected to be exposed to increased water stress due to climate change. If coupled with increased demand, this will adversely affect livelihoods and exacerbate water-related problems.").
5. See *id.* at 13, referencing Chapter 10. This chapter details how "glacier melt in the Himalayas is projected to increase flooding" and how "coastal areas, especially heavily-populated megadelta regions in South, East and South-East Asia, will be at greatest risk due to increased flooding from the sea, and in some megadeltas, flooding from rivers."
6. See IPCC WORKING GROUP II REPORT, *supra* note 3, at 235 (detailing how "[m]any studies incontrovertibly link coral bleaching to warmer sea surface temperature thresholds). Annual or bi-annual exceedance of bleaching thresholds is projected at the majority of reefs worldwide by 2030 to 2050. After bleaching, algae quickly colonize dead corals, possibly inhibiting later coral recruitment."; see also *id.* at 8:

There is high confidence, based on substantial new evidence, that observed changes in marine and freshwater biological systems are associated with rising water temperatures, as

range of large numbers of plant and animal species,⁷ potentially leading to mass extinctions.⁸

Although changes of this magnitude over a relatively short period will likely affect every human inhabitant of the planet in the foreseeable future, for many, the impact is buffered by the very civilization that is creating the problem. For example, air conditioning, geographic mobility in employment, and substantial economic power will allow many to withstand or flee worsening climatic conditions. By contrast, Native Americans and other indigenous peoples may be unable to relocate if their climates become inhospitable: Indian tribes are place-based entities whose subsistence, culture, and spirituality are intimately connected to the lands they inhabit (generally centered on, if not limited to, the reservation). A change in climate can cause the migration or extinction of culturally important species if their habitat and/or feeding areas are no longer suitable. Indian tribes have little opportunity to follow the migrating species because tribes are often tied to specific parcels of land established under treaties and other governmental agreements.⁹ The loss of

well as related changes in ice cover, salinity, oxygen levels and circulation. These include: shifts in ranges and changes in . . . fish abundance in high-altitude oceans . . . range changes and earlier migrations of fish in rivers.

See also id. at 14 (“Increases in sea surface temperature due to climate change are projected to have adverse effects on Mesoamerican coral reefs, and cause shifts in the location of south-east Pacific fish stocks.”).

7. *Id.* at 661. For example, species in Arctic communities are particularly vulnerable to climate changes to their “close relationship with the land, (its) geographic location, reliance on the local environment (and) for aspects of everyday life such as diet”; *see also id.* at 665 (“Important northern fish species such as broad whitefish, Arctic char, and Arctic Cisco, will probably experience population reductions and extirpations, contraction of geographical ranges in response to habitat impacts, and competition and predation from colonizing species.”); *see also id.* at 668:

Changing climatic conditions in Arctic and sub-Arctic oceans are driving changes in biodiversity (and) distribution, most obviously through reduction of sea ice. As the sea ice moves northward, the distributions of crustaceans, adapted for life at the sea-ice edge, and fish such as polar cod, which will forage on them, will shift accordingly and their abundance diminish. This reduction is likely to seriously impact other predators, e.g. seals, sea birds and polar bears, dependent on sea ice for feeding and breeding.

8. *See IPCC IMPACTS SUMMARY FOR POLICYMAKERS, supra* note 4, at 11 (“Approximately 20-30% of plant and animal species assessed so far are likely to be at increased risk of extinction if increases in global average temperature exceed 1.5-2.5° C.”); *see also id.* at 14 (“There is a risk of significant biodiversity loss through species extinction in many areas of tropical Latin America.”); *see also id.* ch. 13, §13.2.4.2, which states: “Climate change will increase the actual extinction rate . . . Among the species that will disappear are Costa Rica’s golden toad, and harlequin frog . . . at least four species of Brazilian anurans (frogs and toads) have declined as a result of habitat alteration . . .”; *see also id.* at 517:

[In Australia and New Zealand,] many species are at risk from rapid climate change because they are restricted in geographical and climatic range. In Alpine zones of both countries, reductions in duration and depth of snow cover are likely to alter distributions of communities, for example favoring an expansion of woody vegetation into herbfields. More fires are likely in alpine peatlands. Alpine vertebrates dependent on snowcover for hibernation are likely to be at risk of extinction. In regions such as south-western Australia, many narrow-ranged endemic species will be vulnerable to extinction with relatively small amounts of warming.

9. EXECUTIVE SUMMARY, CLIMATE CHANGE AND PACIFIC INDIGENOUS NATIONS 1-2 (Alan Parker et al. eds., 2006), available at <http://academic.evergreen.edu/g/grossmaz/IndigClimate2.pdf>.

such species can make the transmission of traditional knowledge by the elders to the next generation more difficult. Furthermore, elders, who are critical for the continuation of the culture, are particularly vulnerable to health stresses caused by heat waves or changes in food supply.¹⁰

Climate impacts can be expected to be especially high on tribal economies. Most tribes depend on agriculture, natural resources, and tourism to drive their economies.¹¹ These activities are directly affected by events such as droughts,¹² hurricanes, and wildfires. In addition, the cost of protecting against these and other costs of climate change is likely to strain already impoverished tribes.

The most extreme impacts of climate change are found in the polar regions, such as the Arctic, home to the Inuit and other indigenous American populations, both because the ecosystem itself is very fragile and because temperature increases in the region are roughly double the average temperature increases experienced by the planet as a whole.¹³ The resulting melting of the glaciers, thawing of permafrost, decrease in both the extent and quality of sea ice, and the rising temperature itself greatly affects Arctic plant and animal populations.¹⁴ For example, the decrease in the area of sea ice,¹⁵ particularly in the summer, puts substantial stress on walrus and seals by reducing the availability of surfaces for resting between feeding dives. Reductions in sea ice, on which polar bears conduct the summer seal hunt, have also severely limited their ability to secure enough nutrition for subsistence and effective breeding.¹⁶ Similarly, while polar bears are powerful swimmers, the distances between ice floes have increased to the extent that there are increasing reports of bears drowning.¹⁷ The situation has reached suffi-

10. *Id.* Climate change affects temperature extremes, not just average temperatures.

11. 12 U.S. National Assessment of the Potential Consequences of Climate Variability and Change, *Native Peoples and Native Homelands*, <http://www.usgcrp.gov/usgcrp/nacc/education/native/native-edu-3.htm> (last visited Mar. 11, 2008):

In a number of regions, Native economies are strongly dependent on tourism, agriculture, and other environmentally sensitive activities. As a result of likely shifts in temperature and precipitation, and changes in ecosystems that are based on the prevailing climate, human activities are likely to require adjustments away from those traditionally undertaken.

12. *See, e.g., infra* note 25.

13. *See generally* SUSAN JOY HASSOL, ARCTIC CLIMATE IMPACT ASSESSMENT (ACIA), IMPACT OF A WARMING ARCTIC, ARCTIC CLIMATE ASSESSMENT 20 (2004), available at <http://amap.no/acia> [hereinafter ACIA]; Union of Concerned Scientists FAQ, *supra* note 1, at 8, 10. These changes affect not only the Far North but potentially accelerate the impact on the rest of the planet in a number of ways. For example, as the icebergs melt, the additional water in the oceans causes not only sea-level rise, but also further temperature increases by replacing ice and snow, which reflect the sun’s heat back into space, with darker soil which absorbs the heat.

14. For a detailed analysis of the impacts of global climate change on the entire Arctic Region, *see id.*

15. Andrew C. Revkin, *Arctic Melt Unnerves the Experts*, N.Y. TIMES, Oct. 2, 2007, at D1 (“The pace of change has far exceeded what had been estimated by almost all the simulations used to envision how the Arctic will respond to rising concentrations of greenhouse gases linked to global warming.”).

16. *See* ACIA, *supra* note 13, at 58; John M. Broder & Andrew C. Rivken, *Warming Could Cost Most Polar Bears, Study Shows*, N.Y. TIMES, Sept. 8, 2007, at A11.

17. AL GORE, AN INCONVENIENT TRUTH 146 (2006).

cient severity that the species has been proposed for listing¹⁸ under the Endangered Species Act.¹⁹

These and other changes directly affect the native peoples of the Arctic in both obvious and subtle ways. Perhaps the most apparent effect is that these tribal communities generally follow a subsistence way of life, i.e., their lives and economies are built around harvesting food from land and sea. These food sources range from marine mammals such as walrus, seals, and whales, to land mammals such as polar bears, moose, and caribou, to fish such as salmon and arctic char, to birds such as ducks and geese.²⁰ As a result, when these animals are threatened or experience a change in range or distribution,²¹ Native Americans are directly impacted. In addition, warming has made the hunt itself more difficult. Unpredictable and broken-up sea ice makes hunting more dangerous. Similarly, less ice cover means that water is rougher and more perilous to navigate. The hunting of geese in the spring is more difficult because the spring melt occurs so quickly.²² Further, the nature of the snow (loose and soft as opposed to hard pack snow) makes both the building of traditional storage cellars to preserve food²³ and of igloos to serve as emergency shelters during sudden storms difficult or impossible.

A recurring theme is the lack of predictability inherent in global climate change. After many generations of observations, Inuit elders have traditionally been able to anticipate seasonal changes, such as ice breakup on rivers, as well as more immediate events, such as storms.²⁴ When this warning mechanism is neutralized, the danger to hunters is enhanced. According to the Arctic Climate Impact Assessment, changing landscapes, seascapes, and icescapes are becoming unfamiliar, causing native peoples to feel like strangers in their own land.²⁵

Some of the most dramatic effects of climate change are flooding, intensifying storms, and the accompanying erosion of riverbanks and seashores. Because the majority of Alaskan native villages exist in low-lying coastal areas, floods and storms threaten 86% of Alaskan native villages to some degree.²⁶ In order to survive, villagers must be moved to higher ground, a very expensive process. For example, the relocation of the village of Newtok is expected to cost as much as \$130 million.²⁷

These changes put Arctic tribes at risk not only physically, but also culturally. Social identity and spirituality are inextricably tied to the hunt and the relationship of the people to the animals with whom they share this world. The stories and ceremonies that not only form the culture but also serve as the means of transmitting it to the next generation are tied to experiencing the reality of the polar bear, the seal, the salmon, and the goose. As a result, these bonds are at risk of being weakened if these creatures are no longer present.

While native people in other parts of the United States are experiencing many of the same impacts, if to a lesser degree, the culture of the Arctic tribes is uniquely at risk. For most of human history, the inhospitality of the harsh Arctic climate discouraged intrusion by non-indigenous people. During the 20th century, the region was first faced with a large influx of immigrants who now outnumber the traditional inhabitants in many regions. As warming progresses and sea ice recedes, the long sought-after Northwest Passage is anticipated to become navigable.²⁸ In addition to triggering potential international conflict for claims to the area and its resources, a new influx of non-indigenous people can be expected,²⁹ creating more and more pressure on traditional languages and ways of life at precisely the time when Native American cultures face monumental challenges in adapting to climate change itself.

Arctic tribes, which feel the impacts of climate change earlier and more intensely than others, are often looked to as the “canary in the coal mine”³⁰ for the planet as a whole, but particularly for other American tribes. While the tribes in the continental United States have received less attention, the same general themes are in evidence. The changing climate affects the range and distribution of animals, making hunting and fishing (a significant source of food for many natives throughout the country) more difficult. For example, Chippewa fishermen in the Great Lakes area face substantially lower water levels.³¹ As with the Inuit in the Arctic, these food-gathering activities are not only important sources of food (both for tribal consumption and as vital sources of revenue), but also stand at the center of tribal culture and identity. The tribes of the Pacific Northwest, for whom the salmon lies at the center of both the subsistence economy and of the culture, will be directly impacted if and when warmer waters increase disease and stress on the fish, and rain-swollen rivers flush newly laid eggs from spawning grounds.³² Without the experience of fishing for salmon,

create their artwork with the same materials, know the land intimately.” *Id.*

18. *U.S. to Consider Listing Polar Bears Due to Climate Change, Other Factors*, ENV'T REP., Feb. 22, 2006, at 126.

19. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

20. See ACIA, *supra* note 13, at 93 (identifying the polar bear as a marine mammal).

21. See *id.* at 58-65 for a clear and detailed explanation of how specific species are impacted by climate change. These changes occur in the most basic building blocks of the ecosystem. Ice algae have been seriously affected and studies show that in the Beaufort Sea “[m]ost of the larger marine algae under the ice . . . died out between the 1970s and the late 1990s and were replaced with less productive species . . .” *Id.* at 60.

22. *Id.* at 65.

23. *Id.* at 96.

24. *Id.*

25. See ACIA, *supra* note 13.

26. Robert D’Oro, *In Many Villages, Alaskan Face Physical and Cultural Erosion*, INDIAN COUNTRY TODAY, Jan. 5, 2007, at A4, available at <http://www.indiancountry.com/content.cfm?id=1096414324>.

27. The alternative of joining another village is unacceptable to the people because “[i]n their nomadic past Natives generally stayed within a certain region. Today they hunt the same animals as their ancestors,

28. See Daniel Foggo, *Melting Arctic Ice Opens Up Fabled Route*, SUNDAY TIMES, Sept. 16, 2007, at 11, available at <http://www.timesonline.co.uk/tol/news/uk/article2461996.ece>; see also McKenzie Funk, *Cold Rush: The Coming Fight for the Melting North*, HARPERS MAG. Sept. 2007, at 45.

29. ACIA, *supra* note 13, at 82-85.

30. See Inuit, as “Miners’ Canary” Lead Fight for the World, INDIAN COUNTRY TODAY, Jan. 4, 2006, at A2.

31. NATIVE PEOPLES-NATIVE HOMELANDS CLIMATE CHANGE WORKSHOP: FINAL REPORT 22 (Nancy Maynard ed., 1998), available at <http://www.usgcrp.gov/usgcrp/Library/nationalassessment/native.pdf> [hereinafter Native Peoples-Native Homelands].

32. For a summary of a study released in early April 2007, by the National Academy of Sciences, see Hal Bernton, *Global Warming Could Deal a Big Blow to Salmon*, SEATTLE TIMES, Apr. 6, 2007, available at http://seattletimes.nwsources.com/html/localnews/2003654082_salmon06m.html.

the lessons of the traditional stories surrounding this animal lose vitality.

Like the Arctic, the arid regions of the Southwest where the Navajo (Dine) and Hopi people make their homes are particularly vulnerable. During the last decade, the Navajo nation (like the rest of the semi-arid West) has experienced a major drought. The shortage of rain to replenish the water table, which serves as the source of springs and well water, can cause the death of both plants and livestock.³³ This, in turn, can have lasting consequences for the ecology of the area. A recent study by the U.S. Geological Survey (USGS) has focused on mapping the sand dunes that cover one-third of the Navajo nation. With increased temperatures and resulting greater loss of moisture, the plants that grow on the dunes and hold them in place die off and the dunes become more mobile, impacting grazing as well as leading to health-impairing dust storms.³⁴ This change may not be reversible. When faced with a shortage of forage for their livestock, Navajo herdsman have no choice but to purchase hay from less-impacted areas. Already stressed economically, they tend to purchase the least expensive hay available, which can be expected to be contaminated with various weed seeds. These seeds, from hardy invasive species like the tumbleweed, are often scattered during the feeding process. When the drought eases, these invasive seeds supplant more vulnerable native species in many places, permanently changing the ecology of the reservation.³⁵ Similarly, the heat and dryness has led to beetles seeking water by sucking the sap of trees such as pinion pine, killing the trees that serve both as a food source and as a medicinal plant.³⁶ Tribal ceremonies rooted in seasonal changes can be disrupted where summers are prolonged and rainy seasons arrive at a different time.³⁷

The same broad pattern impacts tribes across the country. For tribes in the eastern Woodland cultural area, the extinction of species can also be culturally damaging. For many of these tribes (located in the Northeast and in the eastern regions of the Great Lakes) the “Sugar Bush”—the time of tapping the sugar maples for their sap—is an important cultural tradition (and source of nutrition) dependent on the availability of sugar maple trees. Similarly, loss of birch

trees, the bark from which is necessary for the manufacture of many traditional items, can have a serious cultural impact. Black ash trees and sweetgrass are necessary for the crafting of baskets, the technique for which has been passed down for many generations.³⁸

Generally, tribes based in the East that experienced early and devastating contact with Europeans tend to have very small land bases and thus lead a more urban lifestyle. To the extent that members of the tribes are living a lifestyle similar to their non-Indian neighbors, the specific impacts are likely to be similar as well. However, even these broadly experienced impacts may disproportionately affect urban Indians when compared to the population as a whole. Native Americans tend to be some of the poorest citizens in our national community, and it is quite clear that climate change’s health and welfare impacts will fall most heavily on our most vulnerable citizens.³⁹ Although climate change may impact Native Americans’ future disproportionately, their past may hold the key to adapting to this new world.

II. The Importance of Traditional Ecological Knowledge

In large part, the scale of the impact of climate change on Native Americans can be attributed to the people’s strong connection to and heavy reliance on the earth. However, that same connection results in an unparalleled knowledge of the land around them. The expertise developed by native peoples, labeled traditional ecological knowledge (TEK) by environmental scientists,⁴⁰ has come to particular prominence in the context of global climate change. As the world has begun to come to grips with the immediacy and severity of the problem, concerned non-Indian scientists and decisionmakers agree that western and native ways of understanding the world complement each other. This recognition is most developed in the Arctic,⁴¹ but is slowly growing elsewhere.

While TEK is the widely accepted term for this way of knowing, read literally it is too limited and incomplete. TEK is not solely ecological because it “also informs the way communities are socially and economically organized” and it is not limited to traditional understanding because “it is not isolated in the past but is continually evolving.”⁴² Perhaps the best understanding of TEK comes from a list prepared by the Alaska Native Science Commission⁴³ answering the following question:

38. Native Peoples-Native Homelands Workshop, *supra* note 31, at 24.
39. See Andrew C. Revkin, *Climate Change Testimony Was Edited by White House*, N.Y. TIMES, Oct. 25, 2007, available at <http://www.nytimes.com/2007/10/25/science/earth/25climate.html>.
40. SETH APPIAH-OPOKU, THE NEED FOR INDIGENOUS KNOWLEDGE IN ENVIRONMENTAL ASSESSMENT: THE CASE OF GHANA (1992).
41. For a scholarly explanation of traditional Inuit knowledge called “Qaujimaningit,” see Timothy B. Leduc, *Inuit Adaptations for the Changing Global Climate*, Canadian Society for Ecological Economics (Oct. 15, 2005), available at <http://www.cansee.org/cdocs/2005/7/IQ%20Tradition%20Ecology.pdf>.
42. *Id.* at 4. The quotation reflects Timothy Leduc’s summary of the explanations offered by Jaypeeete Arnakak in an e-mail dialogue on the relationship between traditional Inuit and Western Knowledge.
43. The Alaska Native Science Commission (ANSC) was created in 1994 as the culmination of a series of workshops held with native community leaders and elders and Arctic researchers and scientists. Funded through the National Science Foundation, it is the “primary link between the scientific community and the Alaska Native com-

33. See generally *supra* notes 28, 30.

34. See USGS, *Assessment of Sand Dunes and the Effects of Climatic Variation on Dune Mobility in Navajo Land*, <http://geomaps.wr.usgs.gov/navajo/pubs/Dunehandout.pdf> (last visited Mar. 11, 2008).

35. Presentation of Margaret Hiza Redsteer, *Impacts of Climate Change and Land Use on the Navajo Nation: An Example for Native Lands in the Southwestern United States* at the 32d Annual Federal Bar Association Indian Law Conference, Apr. 19-20, 2007 in Albuquerque, New Mexico. She has noted that in this region

the amount of effective precipitation, the moisture not lost to evaporation decreases by approximately two inches for every one degree Celsius increase in temperature . . . Annual rainfall in many parts of the Western Navajo Nation averages between 5 and 7 inches in “normal years,” but has been as low as 1 or 2 inches in many areas during recent drought years.

See also TRIBAL SCIENCE COUNCIL, U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA), NATIONAL FORUM ON TRIBAL ENVIRONMENTAL SCIENCE 65 (2006), available at <http://www.epa.gov/osp/tribes/tribal/Tribal%20Forum%20Summary%20Report-for%20web.pdf>.

36. Native Peoples-Native Homelands, *supra* note 31, at 61.

37. Coninne Purtil, *Tribal Members Meet on Global Warming*, ARIZ. REP., Dec. 4, 2006, available at <http://nativeunity.blogspot.com/2006/12/tribal-members-meet-on-global-warming.html>.

How do Native people define traditional knowledge?

- It is practical common sense based on teachings and experiences passed on from generation to generation.
- It is knowing the country. It covers knowledge of the environment—snow, ice, weather, resources—and the relationships between things.
- It is holistic. It cannot be compartmentalized and cannot be separated from the people who hold it. It is rooted in the spiritual health, culture, and language of the people. It is a way of life.
- Traditional knowledge is an authority system. It sets out the rules governing use of the resources—respect, an obligation to share. It is dynamic, cumulative, and stable. It is truth.
- Traditional knowledge is a way of life—wisdom is using traditional knowledge in good ways. It is using the heart and the head together. It comes from the spirit in order to survive.
- It gives credibility to the people.⁴⁴

While native people are willing to share their knowledge and expertise, they, understandably, come to the table with several concerns. Initially they are concerned that “the extraction of their knowledge from its broader cultural context” may lead to a theft of their intellectual property⁴⁵ or that their knowledge may be misused by decisionmakers to their detriment. The commission concludes: “At best piecemeal extraction of traditional knowledge from its larger cultural context invites misrepresentation and misinterpretation.”⁴⁶ To head off such problems, the Alaska Federation of Natives Board developed a series of guidelines for research. These focus on appropriate mechanisms for obtaining prior informed consent from the native people in question, facilitating their participation in all aspects of the research, acknowledging the contributions of the native people, and fully sharing the final results of the study with the local people.⁴⁷

The conversations between researcher Timothy LeDuc and Inuit elders and hunters give life to the protest that environmental scientists have not and are not sharing their knowledge with the Inuit. Eli Kimmaliardjuk, one participant, articulated the widely shared frustration: “Through news the scientists and politicians could let people know what is happening in the past and the present. If they did this people would know more.” Another elder, Louis Autut, added: “We really don’t believe scientists anymore because they never report anything. Why don’t they give information to us and why don’t they want to know from us?”⁴⁸

This concern for lack of sharing is joined by an objection to using TEK to identify phenomena to then be confirmed by western scientists. This is viewed as treating traditional knowledge with a lack of respect. Writer Charles Wohlforth quotes Alaskan Inupiaq elder Warren Matumeak’s expression of the frustration this practice engenders:

I’ve been telling them this is how it is. They go do scientific study and do a lot of work to prove it, and they come back and say, “Warren, you were right.” It’s just common sense. They use science to prove things we already know.⁴⁹

In addition to creating a charming snapshot of an elder’s relationship with a researcher, this quote also suggests the nature of the contributions that TEK can make if properly used.⁵⁰ TEK contains observations that are both continued over long spans of time and focused on the local environment. As such, it complements western science in a way that can and should assist in policy development.

The benefits of bringing together both ways of studying the world are substantial. The most obvious is the local and particular nature of this expertise, which, in addition to the long time span over which it was developed, provides a particularly sensitive lens through which to evaluate climate change. Impacts will be variable in different locations and at different times and can easily be overlooked by broader scientific studies.⁵¹ This local expertise is important not only for identifying the problem with precision but also for developing policy responses to it. Public policy focused on climate change will necessarily contain two branches: the first of these, and the one that has received the greatest attention to date, is the development of mechanisms to arrest the process by controlling the quantity of GHGs released into the atmosphere as well as developing the political will to implement these mechanisms, discussed below.

The second branch is the development of mechanisms to adapt to this reality. It is in this area that the experience and knowledge of indigenous people can be particularly valuable. Tribal peoples have been adapting to substantial changes in their environments for the last millennia, and while many of the approaches used, such as changing their location, may no longer be possible, this history of flexibility can lead to fresh and useful approaches. Perhaps of greater importance are the current responses of native peoples to changing environments. Because their expertise is based on close observation of small changes and the evolution of practical responses to those changes, it can provide a model for the development of public policies that foster such adaptation. This model of changing behavior based on careful evaluation of experiences is one that has been utilized in recent years under the term adaptive management in a variety of contexts, but can be expected to become more important as decisionmakers come to grips with the reality of climate change.

The importance of traditional knowledge in coping with climate change has, not surprisingly, received the greatest recognition in the context of the Arctic. The Alaska Forum on the Environment has attempted to facilitate the coordination of western science and traditional knowledge. The final report of the U.S. Global Change Research program highlighted the impacts on native Alaskans discussed above. The Canadian government has gone further by directly drawing from TEK in their environmental policies. For ex-

munity.” See ANSC, *History*, <http://www.nativescience.org/about/history.htm> (last visited Mar. 11, 2008).

44. See ANSC, *What Is Traditional Knowledge?*, http://www.nativescience.org/html/traditional_knowledge.html (last visited Mar. 11, 2008).

45. *Id.*

46. *Id.*

47. *Id.*

48. Leduc, *supra* note 41, at 12.

49. CHARLES WOHLFORTH, *THE WHALE AND THE SUPERCOMPUTER: ON THE NORTHERN FRONT OF CLIMATE CHANGE* 90 (2004).

50. See generally Erika M. Zimmerman, *Valuing Traditional Ecological Knowledge: Incorporating the Experiences of Indigenous People Into Global Climate Change Policies*, 13 N.Y.U. ENVTL. L.J. 803 (2005).

51. *Id.* at 827.

ample, the 1997 Oceans Act requires cooperation with aboriginal organizations and supports the use of TEK in the study of ocean ecosystems.⁵² Similarly, recent amendments to the Canadian Environmental Assessment Act authorize the use of community and “aboriginal traditional knowledge” throughout the environmental impact assessment process.⁵³

In the non-Arctic portions of the country, there have been some efforts to consult with Indian tribes regarding global climate change, most prominent being the Native Peoples-Native Homelands Climate Change Workshop.⁵⁴ In addition, the USGS publicly acknowledges that the traditional knowledge of the Navajo (Dine) nation can both increase understanding of the changing environment and influence the “strategies and methods” of scientific inquiry. In particular,

[r]esearch on historical accounts by early Spanish explorers and Indian Service (BIA) annual reports, combined with Navajo oral history, provides descriptions of past landscapes and vegetation, and to record knowledge [sic] of extreme events for comparison with the climatic record.⁵⁵

Unfortunately, this consultation with Indian tribes within the United States (unlike in Canada) has not resulted in any noticeable impact on U.S. governmental policy. Native Americans have increasingly demanded that their voices be heard at both the national and international level. Alaskan native communities, in cooperation with the Native American Rights Fund have presented a petition to Congress demanding action.⁵⁶ The National Congress of American Indians has passed a resolution also seeking federal action. In addition, American Indian tribes have joined forces with indigenous people from other parts of the world demanding a voice in international policymaking.

III. Tribal Responses to Climate Change

The response of the tribes to climate change has been a multifaceted one. Even if the most Draconian measure to limit the release of GHGs began today, some climate change would still occur as a result of emissions over the last century, and the recognition of this has led to various efforts at adaptation. This is made particularly difficult because while native peoples have significant experience adapting to changes in their physical and cultural environment, most past approaches are no longer possible because tribes are often tied to particular reservations and, thus, can no longer move to different and more accommodating environments. Nevertheless, tribes are adapting to the reality of climate change with a variety of responses. These range from local and specialized undertakings, such as moving buildings back from shores subject to erosion, to focused development of plans to preserve traditional food production

and the cultural practices that surround it.⁵⁷ Tribes are also turning to the scientific community for explanations of what to expect so that they can make better decisions for the future of their communities.⁵⁸

A. Coordinated Responses

Tribes are turning to each other to share their expertise in adaptation and to form a coordinated response to climate change. As early as 1998, the Native Peoples-Native Homelands Climate Change Workshop began meeting to allow members of tribes from all parts of the country to share experiences and plan coordinated responses to the problem.⁵⁹ Some of these initiatives are national in scope, such as the adoption by the National Congress of American Indians of a resolution supporting the reduction of GHGs in 2006.⁶⁰ This effort at organizing a coordinated approach to the problem was also reflected in the Tribal Lands Climate Conference held at the Cocopah Indian reservation and cosponsored by the National Wildlife Federation.⁶¹

In addition, regional projects have been organized to deal with these specialized concerns faced within similar ecosystems. The Alaska Forum on the Environment meeting in February 2006 allowed native peoples to share their experiences with diseased fish, winter storms, and other impacts described above. The Northwest Indian Applied Research Institute of Evergreen State College (Washington State) has organized a Climate Change and Pacific Rim Indigenous Nations Project⁶² to coordinate responses by indigenous peoples as diverse as the Polynesian peoples of the Small Island States⁶³ to the aboriginal people of Australia.⁶⁴ These organizations and meetings are designed to allow tribal people to share experiences and strategies for adaptation. These include plans to alert tribal councils and members to the nature of the problem, with a particular emphasis on educating the young, who can be expected to have to respond in the decades to come.

52. Oceans Act, R.S.C., ch. 31, §§29, 33, 42j (Can.), available at <http://www.canlii.org/ca/as/1996/c31>.

53. Environmental Assessment Act, R.S.C., ch. 37, §16.1 (Can.).

54. Native Peoples-Native Homelands, *supra* note 31.

55. USGS, *Traditional Knowledge and the Native Perspective*, <http://geomaps.wr.usgs.gov/navajo/tradition.html> (last visited Mar. 11, 2008).

56. See Native American Rights Fund, *Global Warming Project*, <http://www.narf.org/cases/globalwarming.html> (last visited Mar. 11, 2008).

57. Native Peoples-Native Homelands, *supra* note 31, at 25; Rachel D’Oro, *In Many Villages, Alaskans Face Physical and Cultural Erosion*, INDIAN COUNTRY TODAY, Jan. 10, 2007, at A4.

58. See Leduc, *supra* note 41, at 14.

59. Native Peoples-Native Homelands, *supra* note 31.

60. National Congress of American Indians, Resolution No. EWS-06-2004—Supporting a National Mandatory Program to Reduce Climate Change Pollution and Promote Renewable Energy (2006 Mid-Year Session), available at <http://www.ncai.org/ncai/resolutions/doc/EWS-06-004.pdf>.

61. Sarah Moses, *Seeking Solutions for Global Warming*, INDIAN COUNTRY TODAY, Dec. 8, 2006, available at <http://www.ncai.org/ncai/resolutions/doc/EWS-06-004.pdf>.

62. See CLIMATE CHANGE AND PACIFIC RIM INDIGENOUS NATIONS (Alan Parker et al. eds., 2006), available at <http://academic.evergreen.edu/g/grossmaz/IndigClimate2.pdf>.

63. These states face the prospect of the inundation of their entire land base. Tuvalu has begun expatriating its citizens to New Zealand in anticipation of this crisis. See Alexandra Berzon, *Tuvalu Is Drowning: The Island Nation Is Slowly Being Inundated as the Ocean Rises, and Some Citizens Are Fleeing—How Will the World Handle a Flood of “Climate Refugees”?*, <http://www.salon.com/news/feature/2006/03/31/tuvalu/> (last visited Mar. 11, 2008).

64. See Anna Sale, *Global Warming Hits Indigenous People Most*, AUSTRALIAN BROADCASTING SERV., Apr. 7, 2007, available at <http://www.abc.net.au/cgi-bin/common/printfriendly.pl?/science/news/stories/2007/1892812.htm> (explaining that Indigenous Australians are highly vulnerable to the effects of climate change such as heat stress and flooding and coastal erosion).

This push for coordination has also been focused on developing a strong voice to demand that the non-Indian world, which is largely responsible for creating the problem of climate change, take adequate steps to deal with it. The Native American Rights Fund (NARF) has gathered 162 Alaskan Tribal and Corporate (Alaskan Tribal Corporations) Resolutions which call upon the U.S. government to adopt legislation designed to reduce carbon emissions. These were presented to the Alaska congressional delegation in March 2006.⁶⁵ NARF is also preparing to file suit based on climate change in the immediate future.⁶⁶ In addition to organizing a unified voice on this issue, Native Americans have begun specific climate change mitigation projects.

B. Alternative Energy Projects

A second response by the Indian community to the challenge of global warming has been to undertake concrete projects designed to provide clean, renewable energy, with a focus on wind energy. Several projects are currently underway. For example, the Rosebud Sioux Tribe has constructed a 750 megawatt (MW) wind turbine. This facility not only serves as a source of electricity for the tribe's casino and hotel, but also connects, through the local power distribution system, to the federal transmission grid to supply electricity to Ellsworth Air Force Base.⁶⁷ A similar project is being developed by the Mandan, Hidatsa, and Arikara at Ft. Berthold for a 10 MW project that is planned as part of an 80 MW distributed intertribal project.⁶⁸ Tex Hall, president of the National Congress of American Indians, has pointed out that "[a]n ocean of energy crosses the Great Plains every day. Tribes have many thousands of megawatts of potential wind power blowing across reservation lands."⁶⁹ But as the Intertribal Council on Utility Policy⁷⁰ explains, the development of this clean energy source requires the provision of U.S. Department of Energy (DOE) funding and access to the federal transmission grid as well as changes to the tax incentives for development of clean energy to include the tribes.

In a different approach, the Micah Tribe participates in a consortium which operates the Micah Bay Offshore Wave Energy Pilot Project, using specially designed buoys to convert the motion of ocean waves into electricity.⁷¹ Although

the project will only produce about 2 MW of power during its initial phase, this is expected to ultimately rise to 50 MW. Other tribes are involved with projects that produce power using methane produced by dairy cows⁷² and hydroelectric dams, which, because of their small scale, will not endanger salmon runs.

Several native communities have also undertaken carbon sequestration projects designed to generate carbon offset credits.⁷³ Carbon sequestration occurs when action is taken to remove carbon from the atmosphere and store it—one example of sequestration is planting trees that will absorb and store carbon from the atmosphere. The carbon removed from the atmosphere through these projects can be used to offset carbon emissions generated at some other location, creating a carbon credit that can be traded under international regimes, such as the one established under the Kyoto Protocol.⁷⁴ Within the United States, a nascent carbon trading system has been put into place by the Chicago Climate Exchange.⁷⁵

Tribal projects involving sequestration include a reforestation project under which the Confederated Salish and Kootenai Tribes of Montana will plant trees on 250 acres of land under a \$50,000 contract with a foreign investor.⁷⁶ The Nez Perce Tribe of Idaho has already begun reforestation of land which was previously devoted to agriculture, but was marginal in that use. It has also joined with Montana State University as a cooperating partner under a grant funded by DOE to establish a Regional Carbon Sequestration Partnership initiative. The Nez Perce also act as a technical adviser to the National Carbon Offset Coalition. This group is attempting to set up two separate portfolios of projects, one of which focuses on tribal initiatives. Each of these portfolios hopes to offset 12,500 metric tons of carbon.⁷⁷

It must be noted that the decision to engage in carbon sequestration as a way to combat climate change is not one that is universally supported in the Native American community. Some concerned tribal representatives have spoken out against this approach to dealing with the problem, asserting that allowing polluters to buy offsets merely allows them to

65. See Native American Rights Fund, *Tribal Resolutions on Global Warming From Alaska Native Tribes and Villages*, <http://www.narf.org/nill/triballaw/climate/index.htm> (last visited Mar. 11, 2008).

66. *Id.*

67. U.S. Dep't of Energy (DOE), *Native American Interview: Tex Hall, National Congress of American Indians*, http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=678 (last visited Mar. 11, 2008).

68. *Id.*

69. *Id.*

70. The Intertribal Council on Utility Policy (COUP) is formed by representatives of nine tribes in a three-state area in the Northern Plains. It provides a forum for discussion and development of policy analyses for a wide variety of energy issues from energy efficiency and planning to hydropower allocation, with a strong emphasis on wind energy development. See COUP, *Homepage*, <http://www.intertribalcoup.org> (last visited Mar. 17, 2008).

71. *Wave Energy Project Gets Environmental OK*, RENEWABLE ENERGY ACCESS, Oct. 30, 2006, <http://www.renewableenergyaccess.com/rea/news/story?id=46408> (last visited Mar. 11, 2008).

72. Lewis Kamb, *A Methane to Their Madness*, SEATTLE POST INTELLIGENCER, Apr. 22, 2003, available at http://seattlepi.nwsourc.com/local/118624_manure22.html.

73. See Elizabeth Kronk, *Empowering the Miner's Canary: The Unique Impact of Climate Change on Native Communities and Possible Native Involvement in Climate Change Solutions*, Presentation for 32d Annual Federal Bar Association Indian Law Conference, Albuquerque, New Mexico (Apr. 19-20, 2007) [hereinafter Kronk Presentation].

74. Kyoto Protocol to the United Nations Framework Convention on Climate Change (Mar. 16, 1998), available at <http://unfccc.int/resource/docs/convkp/kpeng.pdf> (the Kyoto Protocol went into effect on Feb. 16, 2005, without the participation of the United States. It calls for industrialized nations to reduce their GHG emissions by 5.2% below 1990 levels by 2012. One allowable way to achieve this is through the purchase of carbon credits.).

75. See Chicago Climate Exchange, *Homepage*, <http://www.chicago-climatex.com> (last visited Mar. 11, 2008), for an explanation of the exchange's policies and structures. The members of this exchange make a voluntary but legally binding commitment, with third-party verification, to meet yearly targets for emissions reduction. As the public becomes increasingly willing to begin making efforts to deal with the climate change challenge, this economic mechanism can be expected to increase in importance.

76. See Kronk Presentation, *supra* note 73.

77. *Id.*

continue their damaging behavior to the detriment of Indian people and the planet.⁷⁸

IV. International Responses

Responses at the international level have been focused on three broad fronts: first, action under international conventions designed to protect the rights of indigenous people generally; second, action under those conventions and principles that protect human rights; and third, active participation in the international mechanism developed explicitly to protect against climate change.⁷⁹

The United Nations and its agencies have been the primary source of law dealing explicitly with the protection of indigenous peoples. These include the International Labor Organization, which in 1989 adopted the “Convention Concerning Indigenous and Tribal Peoples in Independent Countries.”⁸⁰ Article 4 of that convention asserts that “[s]pecial measures shall be adopted as appropriate for safeguarding the persons, institutions, property, labor, cultures, and environment of the peoples concerned.” Further, in Article 7, it states that “[g]overnments shall take measures in cooperation with the peoples concerned to protect and preserve the environment of the territories they inhabit.”⁸¹ In addition, the various documents of the 1992 U.N. Conference on Environment and Development recognize that indigenous people should be supported in their communities and territories. Principle 22 of the Rio Declaration on Environment and Development calls upon States to recognize and support their “identity, culture, and interests, and enable their effective participation in the achievement of sustainable development.”⁸² Similarly, Agenda 21, Chapter 26, provides “[r]ecognition that the lands of indigenous people and their communities should be protected from activities that are environmentally unsound”⁸³

These and similar documents support the argument that the industrial world has a duty to limit those activities producing GHGs which, in turn, threaten destruction of native communities and lands. These principles have received their strongest support to date by the adoption, by the U.N. General Assembly in September 2007, of the Declaration on the Rights of Indigenous People.⁸⁴ Several provisions of that document explicitly recognize the rights of indigenous people to be protected from environmental damage to their lands and communities, specifically the rights to “be secure in the enjoyment of their own means of subsistence and de-

velopment,”⁸⁵ “maintain and strengthen their distinctive spiritual relationship with their traditionally owned . . . land waters and coastal seas . . . ,”⁸⁶ and enjoy the “conservation and protection of the environmental and the productive capacity of their lands . . . and resources.”⁸⁷ The declaration provides strong support for the assertion by indigenous people, including American tribes, that they morally and legally should have a direct voice in policies which affect them so deeply.

An alternate general strategy has been to use the more developed international principles of human rights law to assert that it is a violation of these rights for the economic activity of the non-indigenous world to destroy the land and culture of indigenous peoples.⁸⁸ The most direct challenge based upon human rights took place in 2005 when the Inuit Circumpolar conference (representing Inuit communities in Alaska, Canada, Greenland, and Russia) petitioned the Inter-American Commission on Human Rights⁸⁹ for relief based upon an assertion that the impacts of global warming violate the human rights of Inuit people.⁹⁰

The most direct and immediate efforts by indigenous people in dealing with climate change has been engagement with the process set in motion by the U.N. Framework Convention on Climate Change (UNFCCC). The UNFCCC itself includes no specific commitments or guidelines for the limitation of GHGs, but sets up the framework for a yearly Conference of the Parties (COP) to develop and approve specific agreements or protocols. The most well known of these is the Kyoto Protocol,⁹¹ which was adopted in 1997 by the third COP in Kyoto and entered into effect in 2005. Indigenous representatives have attended all COP meetings beginning in 1998 in various capacities, but usually as nongovernmental organizations. Since the participants at the COPs must be nation-State signatories of the UNFCCC, indigenous attendees have no official status at these meetings. They have therefore generally met in parallel meetings of the Indigenous Forum on Climate Change, which has issued a series of declarations presenting their collective position on the issue.

The first of these declarations, the Albuquerque Declaration, pointed out the strong inherent interest of indigenous people in the climate change issue:

There is a direct relationship between the denial of Indigenous Peoples’ land and water rights, along with the appropriation without consent of Indigenous Peoples’ nat-

78. See Zolton Grossman, *International Indigenous Responses*, in *CLIMATE CHANGE AND PACIFIC RIM INDIGENOUS NATIONS* 39, 46 (Alan Parker et al. eds., 2006).

79. See *id.*

80. Convention (No. 169) Concerning Indigenous and Tribal Peoples in Independent Countries, June 27, 1989, available at <http://www.unhcr.ch/html/menu3/b/62.htm>.

81. *Id.*

82. Rio Declaration on Environment and Development, June 14, 1992, available at <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=78&ArticleID=1163>.

83. *Id.* at Agenda 21, ch. 26, Recognizing and Strengthening the Role of Indigenous People and Their Communities, available at <http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=52&ArticleID=74&l=en>.

84. Declaration on the Rights of Indigenous People, U.N. G.A. Res., 61st Sess., U.N. Doc. A/61/L.67 (Sept. 13, 2007), available at <http://www2.ohchr.org/english/issues/indigenous/declaration.htm>.

85. *Id.* art. 21.

86. *Id.* art. 25.

87. *Id.* art. 29.

88. See generally Grossman *supra* note 78, at 39.

89. This is an agency of the Organization of American States (OAS). See generally OAS, *Homepage*, <http://www.oas.org/main/english/> (last visited Mar. 11, 2008).

90. Inuit Circumpolar Council, *Inuit Petition Inter-American Commission on Human Rights to Oppose Climate Change Caused by the United States*, Dec. 7, 2005, <http://inuitcircumpolar.com/index.php?ID=316&Lang=En> (last visited Mar. 11, 2008).

91. The Kyoto Protocol set mandatory targets for reduction of GHG by 6 to 9%, which was expected to reduce emissions below 1990 levels by 2012. The convention has been ratified by 166 signatory countries, representing 65% of GHG emissions, but has not been ratified by the United States, the largest emitter of GHGs. See Climate Action Network, *Kyoto Protocol Basics*, <http://www.climateactionnetwork.org/climate-change-basics/kyoto-protocol-basics> (last visited Mar. 11, 2008).

ural resources and the causes of global climate change today . . . Coal extraction from sacred earth is being used to fuel the greenhouse gases that are causing global climate warming.⁹²

In later declarations, the importance of giving native peoples a voice is emphasized. For example, the Lyon Declaration of 2001 asserts that “once again, our right to participate in national and international discussions that directly affect our peoples and territories is denied.”⁹³ The Buenos Aires Declaration of 2004 is particularly insistent:

We are hearing from the states the same old arguments being discussed on how to alleviate and mitigate the climate disasters that affect all humanity. These arguments do not address the mounting costs of adapting to climate change within our Indigenous communities. . . . Why are our previous requests to . . . provide a mechanism for us to actively participate in the UNFCCC were not listened to, are we not part of this planet?⁹⁴

To date, these requests for recognition of the special status of indigenous peoples in relation to climate change have not been met.

92. Native Peoples-Native Homelands Climate Change Workshop, *The Albuquerque Declaration*, available at www.nativevillage.org/Inspiration-/Albuquerque%20Convention.htm.

93. Declaration of the First International Forum of Indigenous Peoples on Climate Change, Sept. 8, 2000, available at http://www.Tebtebba.org/tebtebba_files/susdev/cc_energy/lyondeclaration.html.

94. Declaration of the Indigenous Peoples Attending COP-10, UNFCCC, Argentina, Dec. 4-6, 2004, http://www.tebtebba.org/tebtebba_files/susdev/cc_energy/buenosaires.html.

In a parallel strategy, several American tribes have chosen to join a number of American and European cities in symbolically signing the Kyoto Protocol. For example the Little Traverse Bay Band of Odawa of northern Michigan passed a resolution stating that the tribe “commits to meeting the requirements of the Kyoto Protocol and, in doing so, will strive to obtain 25% of our total energy from renewable energy resources by 2020.”⁹⁵ Other native people reject any focus on the Kyoto Protocol as too weak to be helpful.

V. Conclusion

American Indian tribes and indigenous peoples worldwide are suffering from the impact of global climate change not only more intensely than the population as a whole, but also in a way that puts their very existence as a people at risk. For this reason, and also because indigenous peoples offer valuable knowledge that complements western science, they deserve to be brought directly into the national and worldwide conversation to develop strategies to limit and adapt to the problem. Although their numbers are relatively small, their identification of the planet as “mother earth” who must be protected so she can support future generations is one that is often lost in debates over carbon credits and tax deductions. That, even more so than basic fairness, explains why they should be given a voice in combating climate change.

95. Little Traverse Bay Band of Odawa Indians, Resolution No. 051505-01: Adoption of Kyoto Protocol and Renewable Energy Standards (2001), available at <http://www.ltbbodawa.org/OdawaRegister/Legislative/Resolutions/2005/051505-01%20Kyoto%20Protocol.pdf>. The Lac Courte Oreilles Chippewa Tribe in Wisconsin has taken similar action.